CLAIMS

1. A method for linearizing a digitally generated transmit signal, in a transmitter located in a station in a digital mobile radio network, the method comprising the steps of:

performing digital predistortion and frequency response compensation of the digitally generated transmit signal;

performing digital/analog conversion of the predistorted digitally generated signal in order to generate an analog predistorted and frequency response compensated signal from the digitally generated transmit signal;

generating an analog phase adapted and amplitude adapted reference signal from the digitally generated signal;

generating a fault signal by subtracting the analog predistorted and frequency response compensated signal and the analog phase adapted and amplitude adapted reference signal from one another; and

superimposing the analog predistorted and frequency response compensated signal on the fault signal to form an output signal, wherein a numeric variation of the analog predistorted and frequency response compensated signal and phase adaptation and amplitude adaptation of the reference signal are carried out by logically feeding back measurement variables, which evaluate at least one of the fault signal and the output signal, to the analog predistorted and frequency response compensated signal and to the phase adapted and amplitude adapted reference signal.

2. A method for linearizing a digitally generated transmit signal as claimed in claim 1, the method further comprising the steps of:

performing adaptation of the phase and the amplitude of the power minimized fault signal; and

combining the phase adapted and amplitude adapted fault signal with the analog predistorted and frequency response compensated signal, which is delayed, to form a linearized output signal.

3. A method for linearizing a digitally generated transmit signal as claimed in claim 1, the method further comprising the step of:

amplifying the analog predistorted and frequency response compensated signal before the step of generating the fault signal.

4. A method for linearizing a digitally generated transmit signal as claimed in claim 2, the method further comprising the step of:

amplifying the phase adapted and amplitude adapted fault signal before the step of combining the phase adapted and amplitude adapted fault signal with the delayed analog predistorted and frequency response compensated signal.

5. A method for linearizing a digitally generated transmit signal as claimed in claim 1, the method further comprising the step of:

performing digital upmixing of the digitally generated transmit signal, wherein the step of performing digital/analog conversion includes performing digital/analog conversion of the upmixed predistorted digitally generated transmit signal.

6. A method for linearizing a digitally generated transmit signal as claimed in claim 1, the method further comprising the steps of:

performing I/Q dual digital/analog conversion of the digitally predistorted digitally generated transmit signal; and

performing I/Q modulation of the I/Q dual digital/analog converted digitally predistorted digitally generated transmit signal.

7. A method for linearizing a digitally generated transmit signal as claimed in claim 1, wherein generation of a reference signal from the digitally generated transmit signal comprises the steps of:

performing adaptation of the phase and the amplitude of the digitally generated transmit signal;

performing digital upmixing of the phase adapted and amplitude adapted digitally generated transmit signal; and

performing digital/analog conversion of the upmixed predistorted digitally generated transmit signal.

8. A method for linearizing a digitally generated transmit signal as claimed in claim 1, wherein generation of a reference signal from the digitally generated transmit signal comprises the steps of:

performing adaptation of the phase and the amplitude of the digitally generated transmit signal;

performing I/Q dual digital/analog conversion of the digitally predistorted digitally generated transmit signal; and

performing I/Q modulation of the I/Q dual digital/analog converted digitally predistorted digitally generated transmit signal, the I/Q modulated I/Q dual digital/analog converted digitally predistorted digital modulated input signal being frequency compensated with the I/Q modulated I/Q dual digital/analog converted digitally predistorted digital transmit signal.

9. An apparatus for linearizing a digitally generated transmit signal, in a transmitter, for use in a station in a digital mobile radio network, comprising:

a first signal processing path having a digital predistortion unit into which the digitally generated transmit signal is fed and digitally predistorted, on the first signal processing path an analog predistorted and frequency response compensated signal which is derived from the digitally generated transmit signal is transmitted into a nonlinear main amplifier;

a second signal processing path on which an analog reference signal which is derived from the digitally generated transmit signal is transmitted;

a part for combining the analog predistorted and frequency response compensated signal and the analog reference signal to form a fault signal, and for feeding the fault signal into the second signal processing path;

a part in a predistortion and frequency response compensation signal generation path and a part in a reference signal generation path for varying the predistortion of the analog predistorted and frequency response compensated signal and the phase and the amplitude of the reference signal;

a second amplifier in the second signal processing path for amplifying at least one of the phase varied fault signal and the amplitude varied signal;

a part which combines an output signal of the second amplifier in the second signal processing path with the analog predistorted and frequency response compensated signal in the first signal processing path to form a further output signal;

a correction loop which includes the part for combining the analog predistorted and frequency response compensated signal and the analog reference signal, the second amplifier and the part which combines an output signal of the second amplifier with the analog predistorted and frequency response compensated signal; and

a part for logically feeding back measurement variables, which evaluate at least one of the fault signal and the further output signal, to the analog predistorted and frequency response compensated signal and to the phase adapted and amplitude adapted reference signal.

10. An apparatus for linearizing a digitally generated transmit signal as claimed in claim 9, further comprising:

a unit for adapting the phase and amplitude of the fault signal in the second signal processing path.

11. An apparatus for linearizing a digitally generated transmit signal as claimed in claim 9, further comprising:

a first delay unit for delaying the analog predistorted and frequency response compensated signal in the first signal processing path.

12. An apparatus for linearizing a digitally generated transmit signal as claimed in claim 9, further comprising:

a device for observing the fault signal in the second signal processing path.

13. An apparatus for linearizing a digitally generated transmit signal as claimed in claim 9, further comprising:

a second delay unit for delaying the reference signal, provided in the second signal processing path upstream of the part for combining the analog predistorted and frequency response compensated signal and the analog reference signal.

14. An apparatus for linearizing a digitally generated transmit signal as claimed in claim 9, further comprising:

a transmitter unit for generating the digitally generated transmit signal;

a first signal shaping path for deriving the analog predistorted and frequency response compensated signal from the digitally generated transmit signal, an output of the first signal shaping path leading into a first input line which leads to the nonlinear main amplifier in the first signal processing path; and

a second signal shaping path for deriving the analog reference signal from the digitally generated transmit signal received by the transmitter unit; an output of the second signal shaping path leading into a second input line leading to the part for combining the analog predistorted and frequency response compensated signal and the analog reference signal.

15. An apparatus for linearizing a digitally generated transmit signal as claimed in claim 14, wherein:

the first signal shaping path includes the digital predistortion unit, a first unit for digitally upmixing the predistorted digital data which is output by the digital predistortion unit, and a first digital/analog converter by which the digital data which is output by the first unit for digital upmixing is converted into the analog predistorted signal; and

the second signal shaping path includes a second unit for adapting the phase and the amplitude of the digitally generated transmit signal received by the transmitter unit, a second unit for digitally upmixing the digital data which is output by the second unit for adapting the phase and the amplitude, and a second digital/analog converter by which the digital data which is output by the second unit for digital upmixing is converted into the analog reference signal.

16. An apparatus for linearizing a digitally generated transmit signal as claimed in claim 14, wherein:

the first signal shaping path includes a digital predistortion unit, a first unit for the I/Q dual digital/analog conversion of the predistorted and frequency response compensated digital data which is output by the digital predistortion unit, and a first I/Q modulator for modulating the signal, which is output by the first unit for the I/Q dual digital/analog conversion, into the analog predistorted and frequency response compensated signal;

the second signal shaping path includes a second unit for adapting the phase and the amplitude of a digitally generated signal received by the transmitter unit, a second unit for the I/Q dual digital/analog conversion of the predistorted and frequency response compensated digital data which is output by the second unit for adapting the phase and the amplitude, and a second I/Q modulator for modulating the signal, which is output by the second unit for the I/Q dual digital/analog conversion, into the analog reference signal; and

the first I/Q modulator and the second I/Q modulator are connected via a connecting line into which signals of a local oscillator circuit unit are fed.